

WHAT IS CLAIMED IS:

1. An electropolishing apparatus comprising:

a polishing surface plate including a cathode and turnably disposed;

a polishing pad disposed on said polishing surface plate, to be impregnated with an electropolishing liquid, and showing electric conduction from the face side to the back side thereof in the state of being impregnated with said electropolishing liquid;

a substrate holding unit for holding a work substrate with a work surface of said work substrate opposed to a polishing surface of said polishing pad, said substrate holding unit turnably disposed at a position opposed to said polishing pad;

an anode to be brought into contact with said work surface of said work substrate held by said substrate holding unit;

a chemical liquid supply unit for supplying a chemical liquid used for polishing onto said polishing pad; and

a power source for supplying electric power between said cathode and said anode.

2. The electropolishing apparatus as set forth in claim 1, wherein

said chemical liquid supply unit comprises: a chemical liquid control unit for individually controlling the quantities of said electropolishing liquid, free abrasive grains, and pure water supplied; and

means for supplying said electropolishing liquid, said free abrasive grains, and pure water in the quantities controlled by said chemical liquid control unit.

3. The electropolishing apparatus as set forth in claim 1, further comprising:

a cup for receiving a chemical liquid discharged from the top of said polishing pad, said cup provided around the side periphery of said polishing surface plate and on the bottom side of said polishing surface plate, and

a chemical liquid discharge unit provided in said cup at a position lower than said polishing surface plate.

4. A polishing method comprising the steps of:

disposing, on a polishing surface plate including a cathode and turnably disposed, a polishing pad to be impregnated with an electropolishing liquid, said polishing pad showing electric conduction from the face side to the back side thereof in the state of being impregnated with said electropolishing liquid, and

holding a work substrate by a substrate holding unit which is turnably disposed, with a work surface of said work substrate opposed to said polishing pad;

thereafter supplying a chemical liquid used for polishing onto said polishing pad to impregnate said polishing pad with said chemical liquid; and

bringing an anode into contact with said work surface of said work substrate held by said substrate holding unit, turning said polishing pad and said work substrate while maintaining said work surface of said work substrate in contact with a polishing surface of said polishing pad, and supplying electric power between said cathode and said anode, to thereby polish said work surface of said work substrate.

5. The polishing method as set forth in claim 4, wherein

after electropolishing by use of said electropolishing liquid and free abrasive grains is conducted, the supply of electric power between said cathode and said anode is stopped, and

chemical mechanical polishing of said work surface of said work substrate is subsequently conducted by use of said polishing pad.

6. The polishing method as set forth in claim 5,

wherein

after said chemical mechanical polishing is
conducted,

the supply of said electropolishing liquid and said
free abrasive grains is stopped, and

thereafter finish polishing of said work surface of
said work substrate is conducted while supplying pure
water onto said polishing pad.